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A COMPREHENSIVE FOREST RECREATION OPPORTUNITY INFORMATION SYSTEM

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ABSTRACT

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Title: A Comprehensive Forest Recreation Opportunity Information System

Abstract: As participation in outdoor recreation activities increases and recreation resource management becomes more complex, a comprehensive recreation opportunity information (ROI) system can provide a means of informing visitors, solving problems, and facilitating land allocation and management decisions.

Initially, this paper described a comprehensive Forest ROI system based upon a framework of three interrelated components: 1) the audience, 2) the information, and 3) the methods used to manage the data and communicate the information to the audience. To demonstrate this system, the balance of the project focused on the development and implementation of the Boise National Forest ROI System.

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INTRODUCTION

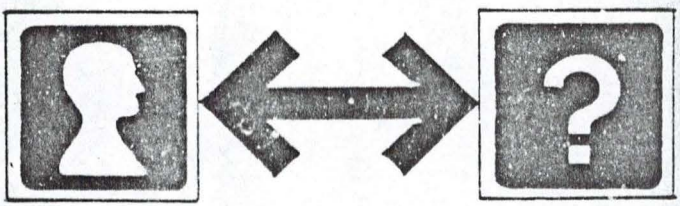
"Do you have any rock climbing areas around here?"

"Where can I go with my dirt bike?"

"Do we have an adequate number and dispersion of semi-primitive nonmotorized areas to meet future demand?"

These types of questions are often difficult to answer without a system of collecting, organizing, and displaying recreation opportunity information. As participation in outdoor recreation activities increases and recreation resource management becomes more complex, a comprehensive Forest Recreation Opportunity Information (ROI) system can provide a means of informing visitors, solving problems, and facilitating land allocation and management decisions.

An ROI system includes three interrelated components: 1) the audience, 2) the information, and 3) the methods used to manage the data and communicate the information to the audience (Belliston et al. 1978) [Figure 1]. Information on these three components is first collected and assembled into the ROI system format. Once this framework is established, the existing Forest level system can be analyzed. Missing information can then be identified and a more comprehensive Forest ROI system can be developed and implemented.



RECREATION OPPORTUNITY INFORMATION SYSTEM

Figure 1

The categories of resource, goods and services, and recreation public constitute the major groups within the audience component of the ROI system. General discussions of the system examine these broad categories; however, within the system, the recreation public is subdivided to more accurately reflect the wide range of interests and diversity of needs within this audience group.

In the early 1960s, the Forest Service developed an information system to aid in managerial and planning decisions. Since its inception, the computer-based Recreation Information Management (RIM) system has been modified to meet the increasing, ever-changing demand for recreation resource information. In the early 1980s, the Forest Service adopted the Recreation Opportunity Spectrum (ROS) system and incorporated this system into RIM. The ROS system provides a "framework for stratifying and defining classes of outdoor recreation environments." (ROS Users Guide 1982) These "environments" are expressed in terms of three principal opportunity elements: the activity, the setting, and the experience. These recreation opportunities form the basis for the information component of the ROI system.

Outputs from the RIM system are designed primarily for the recreation planner and manager, and generally only information about activity opportunities and managerial conditions, i.e. rules, regulations, etc. have been available to the recreation public. If more information describing setting opportunities was available, recreationists could more easily choose the experiences they prefer. (Clark 1978)

Computer technology is a flexible and increasingly useful tool for managing data and disseminating opportunity information, and this form of displaying recreation information will become more readily available. Although the Forest Service uses computers extensively, most software programs reside in a large computer service center accessed via expensive telecommunication systems. Normally, the output is not in a useable format for most segments of the recreation public.

In the early 1980s the Forest Service implemented the Forest Level Information Processing System (FLIPS) using a computer system purchased from the Data General Corporation. As a result of FLIPS, by the mid 1980s all units in the Forest Service will gain access to "in-house," mainframe computers. This new capability will permit the entry, storage, and retrieval of information at the Forest level. The greater flexibility and accessibility of this system by all audience groups will also enhance inter- and intra-communication between Forest Service administrative units.

A. Purpose of Project

The purpose of this project is to develop a system that considers various audience's needs for recreation opportunity information, collects and manages this data, and finally communicates this information to these audiences. This project involves a two part study. The first part of this paper describes a comprehensive Forest Recreation Opportunity Information (ROI) system. The balance of the project focuses on the development and implementation of an ROI system for the Boise National Forest.

B. Assumptions and Limitations

1. A comprehensive Forest ROI system is feasible using Data General software programs that are, as yet, untested in the Forest Service.

2. The principle concepts and components of the Recreation Opportunity Spectrum (ROS) and Recreation Opportunity Guide (ROG) inventory systems are well established and significant modifications requiring major revisions in the ROI System are unlikely.

3. The elements and level of detail within the audience, information, and method components of an ROI system will vary by location and administrative level.

4. Some knowledge on the use of Data General software and equipment will be necessary to manage and access data in the ROI system database until more sophisticated equipment is available, such as touch sensitive screens or voice activated terminals.

5. This paper will be revised, as necessary, to document further ROI system refinements and implementation of the Boise National Forest ROI system.

C. Definitions

Recreation Opportunity:	The opportunity to engage in a preferred activity, within a desired type of setting, to realize specific types of satisfying experiences.
Activity Opportunity:	Options to participate in a particular activity, such as cross-country skiing.
Setting Opportunity:	Options to recreate in an environment with physical, social and managerial features, such as cross country skiing in uncrowded, varied terrain.

Experience Opportunity: Options to realize desired types of satisfying experiences, such as competence testing.

Computer Terminology

Hardware: Every part of a computer except the programs, including the computer keyboard, monitor, disk drive, etc.

Software: All the instructions and data in a computer; the programs that a computer carries out.

Mainframe: An entire, large computer system.

Schema: A detailed description of all the different types and relationships of information to be stored in the database: data items, record types, and set types.

Data Items: Individual units of information.

Record Types: A collection of data items.

Set Types: Describes a relationship between two record types.

LITERATURE REVIEW

Preparation of this report involved examining literature in several areas, including: 1) the rationale for developing an ROI system, 2) existing ROI systems, 3) recreation information needs, and 4) methods of data management and information dissemination.

A. Rationale for Developing an ROI System

Managing recreation opportunity information to improve recreation resource management decisions and increase visitor satisfaction was an underlying and often explicit theme throughout much of the literature reviewed. In respect to recreation resource managers and planners, Driver of the Rocky Mountain Forest and Range Experiment Station states that "the challenge (for resource managers and planners) is to define more clearly what is being 'produced' in different recreation environments for different types of users and then use that information to help establish more explicit guidelines for management decisions ..." (Driver 1977) In another paper, Driver and P. J. Brown of Colorado State Univeristy emphasize the need for knowledge bases in assessing the physical capabilities of the resources and understanding outdoor recreationists' preferences. (Driver and Brown 1978)

More and Buhyoff (1979) suggest that the basic goal of recreation managers and planners is to produce opportunities for high quality recreation experiences. Managing recreation problems requires an understanding of the recreationists' motives. More and Buhyoff have established an equation for estimating the strength of motivation and believe the management of information can change this motivational level and help modify visitor expectations.

In one of Schreyer's lectures, he discusses Driver's Outdoor Recreation model. Information plays an important role in this model. Schreyer states that managers "can affect demand by and through information that changes the environment or information standpoint." (Schreyer 1983) Therefore, it is up to the manager to foster realistic expectations by providing current recreation opportunity information.

B. Recreation Opportunity Information Systems

Although the Forest Service Recreation Information Management (RIM) system provides an excellent computer-based framework for recreation resource information, this system is primarily designed for recreation resource managers and planners. Developed in the mid-1960s, RIM includes locative, descriptive, quantitative, qualitative, and associative information on National Forest recreation facilities and areas. (USDA RIM Handbook)

The Recreation Opportunity Inventory and Evaluation (ROIE) system responded to the need for qualitative, quantitative, and response-to-change data to adequately plan for "long range provision of recreation opportunities in harmony with the provision of other land use benefits." (USDA 1974)

John Hendee of the Pacific Northwest Forest and Range Experiment Station et al. discuss the need for adequate information about dispersed recreational sites in roaded areas, back country, and wilderness to aid in planning, management, and research. Their dispersed site inventory system, Code-A-Site, displays this useful information using an edge-punch card system. The data can also be easily transferred to a computer storage and retrieval system. (Hendee et al. 1976)

Another inventory system reviewed included the Indiana Outdoor Recreation Management Information System (RMIS). This system is primarily intended for recreation resource planners and managers and provides information summaries on such items as recreational establishments by location and ownership and detailed facilities data. (Moser and Titzer 1978)

Region 1 of the U.S. Forest Service developed a coordinated system of information about recreation opportunities, the Recreation Opportunity Guide (ROG). The system was designed to improve the management of the recreation resource and its users, as well as to improve the quality of visitors' experiences. (USDA 1979)

This system has the potential for providing the most detailed information on recreation opportunities. ROG also has the added benefit of furnishing the general public a means of making "choices about the types of settings in which to recreate and the sorts of activities in which to engage." (Clark 1978)

ROG is designed for both the general public and the recreation resource manager. Presented in a text and map format, this system indexes recreation opportunities by areas, routes, waterways, and sites. ROG also incorporates current recreation information, such as road or campground closures and public safety. (USDA 1979)

The Recreation Opportunity Spectrum (ROS) system uses the strong points of several recreation resource inventory systems, including the BOR Area Classification Plan, Recreation Opportunity Inventory and Evaluation, Recreation Inventory Instructions, and the Canadian Land Inventory. (Brown 1980) "The ROS system is based on the concept that the activity, setting, and experience dimensions of recreation demand for a particular type of opportunity are quantitatively and qualitatively related, and that resources can be inventoried in terms of their potential to provide outdoor recreation opportunities defined in terms of these three dimensions of recreation demand." (Driver and Rosenthal 1982)

Possible combinations of activity, setting, and experience opportunities have been arranged along a continuum. This spectrum is divided into six classes: Primitive (P), Semi-primitive non-motorized (SPNM), Semi-primitive motorized (SPM), Roaded Natural (RN), and Rural (R).

C. Recreation Information Needs

Most of the literature reviewed focused on the concepts of recreation behavior relevant to recreation planning and management. The general trend appears to be towards integrating setting and activity attributes with the desired experiential outcomes. (Driver 1975; Driver 1977; Driver and Knopf 1977; Stankey 1977; Brown et al. 1978; Driver and Brown 1978; Bryan 1979; More and Buhyoff 1979; U.S.D.A. ROG Manual 1979; U.S.D.A. ROS Users Guide 1979; Harris 1981; Bryan 1982; U.S.D.A. et al. 1982, and Schreyer 1983)

The conventional approach to recreation planning and management has its roots in activity opportunities. The behavioral approach to recreation resource management recognizes, "that people's perceptions and expectations regarding the experience may be just as or more important than the actual recreation activity." (Bryan, 1982) Information on the behavioral aspects of outdoor recreation can aid planners and managers in evaluating the recreation resource potential for providing particular types of users with specific types of experiences and benefits. (Driver and Knopf 1977)

Shontz et al. (1975) of Montana State University describe a model of recreation succession (RS) in their Gallatin Canyon Study. The major elements of this RS model include user characteristics, physical characteristics of the environment, resource allocation, and management policy and direction. The RS model helps to illustrate the "relationships between management decisions, user satisfaction with their recreational experiences, and subsequent recreation succession." This concept of succession describes a change in the types of recreationists using a particular area or in the nature and/or level of recreational activities occurring in this area.

Many studies have been conducted quantifying preferences of outdoor recreationists and the factors that influence these preferences. Research supports three basic theories: 1) recreationists' value of an experience relates directly to the specific activities and environments, 2) the desired experiences vary by activity and influence the demand for a particular activity, and 3) although an activity may provide several types of satisfying experiences, those experiences with highest value will determine the choice of an activity." (Driver 1975)

D. Data Management and Information Dissemination

Interpreting data into interesting and useful information is of primary importance in an ROI system. Computer technology provides an excellent means of managing this data and disseminating the information. A 1983 issue of Trends and the annual Workshops on Computers in Recreation and Parks concentrate on the topic of computers in parks and recreation. Topics, including facility reservation systems, computer simulation, computer graphics, and touch sensitive input for data entry. (U.S.D.I. and NRPA 1983; NRPA 1980)

A pilot test of the Touch Sensitive Visitor Information System was conducted by the National Park Service (NPS) in 1980. The touch sensitive technology can be retrofitted onto an existing terminal. "No specialized training or keyboard is needed. The user interfaces with the computer by touching menu-formated software choices displayed on the terminal screen." (Goetz 1984)

Information Dialogues (1980) provided the hardware and reported on the project. The test results suggest that the System was well accepted by the NPS staff and visitors and was also an enjoyable and beneficial experience.

The Data General manuals provide the basic information on the design and implementation applications systems for the Data General Database Management System. (Data General 1980) There are many ways to disseminate information. Krumpe and Brown (1982) reported on the successful application of a "trail selector device" to distribute backcountry use. This selector, supplied by the recreation manager, displayed a decision tree with information about 28 low use trails. This brochure met the public's need for information and at the same time helped the manager accomplish a recreation objective.

The ROG system as described earlier in the report, uses a text and map format. Lintelmann in his paper submitted for the Utah State University Outdoor Recreation Management program expands on the ROG concepts by describing a method using a decision analysis system and photographic displays to aid recreationists in selecting a setting that will best fit the experiences they seek. (Lintelmann 1979) In another Outdoor Recreation Management program paper, Carson incorporates a decision tree approach with ROG using Driver's list of expected outcomes. (Carson 1979)

COLLECTION OF DATA

With a systematic approach to collecting, organizing, and displaying recreation opportunity information, it is much easier to respond to questions about the recreation resource. This chapter explains the process used in describing a comprehensive Forest Recreation Opportunity Information (ROI) system and the development and implementation of a comprehensive ROI system for the Boise National Forest.

A. Describe a Comprehensive Forest Recreation Opportunity Information System

An ROI system is composed of three elements: the audience, the information, and the methods used to manage data and to communicate the information to the audience. Obtaining information on these components and their interrelationships involved informal contacts with individuals or groups involved in various aspects of recreation, such as information specialists, recreation managers and planners, and the recreation public. Other areas providing input included: Forest Service manuals and handbooks relating to recreation and visitor information service; Forest mailing lists; selected inventory systems, including the Recreation Information Management system (RIM), the Recreation Opportunity Spectrum (ROS), the Recreation Opportunity Guide (ROG), Code-A-Site, and the Indiana Recreation Inventory System; and research data and papers concerning all components of the ROI system.

B. Develop a Boise National Forest ROI System

Initially, this process involved determining what component information was appropriate for the Boise National Forest ROI system. The component information currently available was identified, and the existing Boise National Forest ROI system was then analyzed to identify gaps in the component information. Recommendations were made to further develop these areas, and a plan was prepared to implement the Forest ROI System.

ANALYSIS AND INTERPRETATION

Describing a comprehensive Recreation Opportunity Information (ROI) system involved identifying its component parts: the audience, the recreation opportunity information needed or requested by these audiences, and the methods used to manage the data and disseminate the information to the audiences. The Boise National Forest ROI system was developed and evaluated to determine gaps in the component information and a plan to implement the Forest ROI system was formulated.

A COMPREHENSIVE ROI SYSTEM

A. Audience

In general, three broad categories of audiences exist within an ROI system: 1) the resource group, 2) the goods and services group, and 3) the recreation public.

1. Resource Group

The resource group consists of those individuals or groups involved in planning, managing, and/or interpreting the forest recreation resource. For the most part, this group includes various levels of the Federal government, both intra and inter-agency, as well as state and local government entities. The audiences within this group more specifically include planners, managers, resource specialists, information specialists, researchers, and members of special recreation commissions. (USFS, RIM Handbook) This group remains fairly constant throughout the Forest Service System.

2. Goods and Services Group

The goods and services group includes individuals or groups that directedly or indirectly profit from use of the recreation resource. This private sector group is usually engaged in providing goods and/or services to recreation users and includes lodge and resort owners, campground operators, recreation equipment dealers, outfitters and guides, campground directory preparers, and recreation facility developers, to name a few.

3. Recreation Public

The recreation public is the most complex and diverse group. For purposes of planning, it is necessary to "distill the population down to a manageable group based upon lifestyle and experience...People are diverse, but yet they tend to seek similar needs in similar activities..." (Schreyer 1983)

In analyzing the recreation public, the relevant range of desired experiences within activity categories must be determined and levels of specialization identified. Bryan (1979) studied the role of specialization in recreation behavior. Initially, the "first-time" recreationist is primarily interested in getting results, i.e. a fisherman catching a fish. As the individual becomes more proficient in the activity, the number of successes or a setting with greater challenges becomes the emphasis, i.e. a trout fisherman "catching a limit". After this stage of development comes a more specialized phase, i.e. the flyfisherman tying his own flies and/or having a greater preoccupation with the specialized equipment of that particular sport. At the extreme end of this continuum are those recreationists who place great value on the specific resource setting required for a quality experience, i.e. the flyfisherman who fishes in a catch or release area and is not concerned with the catch number but rather with the techniques of "outsmarting" the fish.

RIM provides the primary activity breakdown with research findings and other literature sources further subdividing these activities into various levels of specialization or behavior. See Appendix A for the activity opportunity classification.

B. Information

Areas addressed in this section include: 1) identifying what types of recreation opportunity information are available, and 2) consolidating and organizing this information into a manageable framework. This approach helps to avoid collecting unnecessary data and duplicating existing data and also eases use of the recreation opportunity information by incorporating it into a more comprehensive framework.

In identifying the types of recreation opportunity information available, the ROS system provides the best framework for developing the various information categories. This information was structured as a hierarchy using the demand dimensions of ROS: the activity, the setting, and the experience as the primary information categories.

Categorizing the recreation public audience group by activity also provides the basis for the activity information category. (See Appendix A). This list will require further refinements as the activities are interfaced with the setting and experience categories.

The setting category was divided into physical, social and managerial information. This category included much of the same information needed to complete the ROG and ROS inventories.

The experience category is a list of Driver's item pool of potential psychological outcomes from a recreation experience. (Driver 1977) An experience opportunity may include a "bundle of desired and expected psychological outcomes which are valued the highest by a particular user or user group." (Brown et al. 1978) Appendix B displays in more detail how the recreation opportunity information is organized by categories and reference source.

C. Methods

The methods component of an ROI system includes systems for managing data, as well as disseminating information to the various audience groups. Traditional filing, library, and end punch card systems will remain useful; however, the computer will undoubtedly become the primary method for information storage and retrieval because it can process large volumes of data quickly and efficently. The Forest Service uses a variety of methods for communicating recreation opportunity information to audience groups, ranging from the most basic information sheet or brochure to the highly technical computer printout.

1. Data Management

Since computer technology provides the most capability for data entry, storage, and retrieval, this method was selected to manage the recreation opportunity information. Two computerized methods can be used to manage data: a file or database system. The Forest Service has used the RIM data base management system for the last 20 years. A database has proven more useful than the alternative of a computerized, file-oriented system supported by a set of sequential files and dependent programs. (Moser and Titzer 1978)

"File information systems have several inherent disadvantages. Among them are data redundancy, high program to file interdependence,...and little or no user interaction." (Moser and Titzer 1978) With a database management system, an organization can pool its data, reduce duplication of common data, and make accessing and updating of the data easier and more efficient. This system should free users from data maintenance and structure concerns and allow them to concentrate on data manipulation. (Data General 1980)

With implementation of the Forest level information processing system and purchase of the Data General computer system, the DG/DBMS (Data General/Database Management System) was the logical selection for the ROI system database. DG/DBMS allows storing, retrieving and updating of database records and consists of several components, including a file management system, a data manipulation language, a database control/executive subsystem, a data description language (DDL), a data definition facility (DDF), a query/report processing facility, privacy controls, and a recovery mechanism. The DG/DBMS also interfaces with PRESENT an interactive query program that allows access to the database and will display and/or print data in an easy-to-read report format.

A database is constructed of data records that, in turn, consist of data items (fields) or individual units of data. Information on relationships between data records is also included in a database. The schema describes the record types that will be stored in the database and the relationships between records (sets) that will be established.

A record name and description of all its data items comprise a record type. There are many ways to store data in the DG/DBMS. The set types that are defined determine the ease and flexibility of accessing the data. These set types describe one owner and one member record type and define the various paths that the system can take to locate data. (See Figure 2)

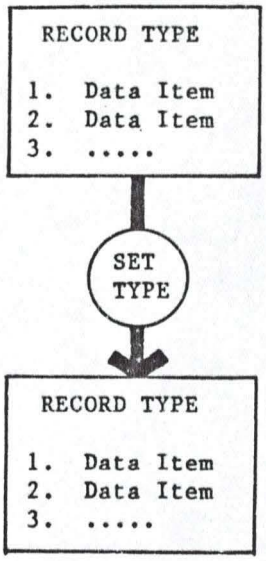


Figure 2

Data General refers to PRESENT as an Information Presentation Facility that turns data into information. This program functions as a query language, graphics package, and a report writer. It formats data into a report or chart through a sequence of commands (query). PRESENT combines "intelligent data selection with powerful data manipulation and output formatting capabilities." (Data General 1980)

2. Information Dissemination

Information can be communicated in many ways, and each unit must determine which methods are most appropriate for their particular situation. Computer printouts, listing and summarizing recreation opportunities, will be used extensively. This information may be further interpreted for the goods and services and recreation public audience groups. These interpretation techniques could include written formats, such as ROG texts; brochures; information flyers; maps; audiovisual techniques, including video, slide, and film presentations; displays; exhibits; and television or radio shows. Highly sophisticated equipment, such as touch-sensitive video screens, are not currently economically feasible for most Forests; however, these techniques will undoubtedly be used in the future, and the design of this system is flexible enough to incorporate new ideas and technology.

The best means of communicating the information to the audience group must be considered when analyzing communication techniques. This process includes identifying the appropriate combinations of activity, setting, and/or experience information needed by the audience groups; organizing the information into an understandable product, and making the information readily available to the audience groups. Shontz et al. use indexes to "reflect the principle components of the environment to which people react." (Shontz et al. 1975) These indexes could be adapted for use in an ROI system. An example of their Scenic Beauty Index follows.

I. Scenic Beauty Index

- A. Visibility
- B. Biological scenery
- C. Geological scenery
- D. Water index
  - 1. Proximity
  - 2. Amount
- E. Man-made characteristics
- F. Visual pollution

These types of indexes or groupings of setting or experience characteristics can provide the resource audience group with information on the relationships between a change in management direction and a change in recreation behavior. These same indexes may also be useful to the other audience groups by providing them with information on possible environmental settings or experiences. Certain information will be organized into standardized reports; however, reports can be requested to meet other user information needs.

THE BOISE NATIONAL FOREST ROI SYSTEM

A. Audience

Existing Situation:

The three broad cateogries of audience groups are also an integral part of the Boise National Forest (BNF) ROI System. The members of the resource group presently include the planners, managers, and information specialists on the Forest.

The goods and services group includes many retail establishments, lodges, resorts, restaurants, etc. within or near the BNF. Those uses included on the Forest will be identified; however, the remaining uses are far too numerous to mention individually. This group will be considered collectively within the System.

Developed Sites

Winter Sports:
- Bogus Basin Ski Area

Resorts/Lodges:
- Fall Creek Lodge
- North Shore Lodge
- Warm Lake Lodge
- Deadwood Lodge
- Banks Resort

Dispersed Areas

Outfitters and Guides:
- Whitewater raft trips
- Cross-country ski tours
- Big game hunting trips

The recreation public is the most diverse segment of the audience groups. In the user activity listing in Appendix A, an asterisk has been placed next to the major activities specific to the Boise National Forest based on the 1983 RIM use statistics. These activities will be further defined and used in the development of the Forest ROI system.

Future Needs:

Although it is difficult to anticipate future developments in the recreation field that result in new recreation activities, demands, and impacts, the flexibility of this system allows for these future additions.

Recommendation:

1. Re-evaulate the recreation public audience group during development of the database schema to ensure consideration of all relevant activities.

B. Information

Existing Situation:

The information component hierarchy and reference sources provide the basis for determining gaps in the Boise National Forest (BNF) information component. Although much of the recreation opportunity information is available, there are several areas in the BNF information hierarchy that require further development.

The following reference sources are available on the Boise National Forest:

1. RIM
2. ROS inventory
3. Variety class inventory
4. Existing visual condition (EVC) inventory
5. Forest recreation map
6. U.S.G.S. 7 1/2' quadrangle maps
7. Road inventory
8. Trail inventory
9. Land type inventory
10. Timber condition class inventory
11. Forest Service recreation manuals and handbooks
12. Code of Federal Regulations (CFR)
13. Special orders
14. Off-Road Vehicle (ORV) Travel Plan
15. Signing for safety precautions
16. National Forest Recreation Survey (NFRS)
17. Recreation Composites
18. Forest recreation reports

Future Needs:

To adequately consider the recreation opportunity needs of the audience groups, the ROG and Code-A-Site inventories are needed to provide a more current, detailed record of the recreation opportunities available on the Boise National Forest.

Recommendations:

1. Complete a ROG inventory (which includes a Code-A-Site inventory) for each District on the Forest. Developed site information is readily available; but information about dispersed areas is lacking. The largest number of opportunities exist in these areas; therefore, the priority for the ROG development will be based on RVD use figures in dispersed areas and availability of personnel to complete the inventory. Additional funding should be provided to the Districts during the year in which they prepare the ROG.

Priority	District
1	Lowman
2	Cascade
3	Emmett
4	Boise
5	Mountain Hom-
6	Idaho City

C. Methods

1. Data Management

Existing Situation:

In January, 1984, the Data General Corporation delivered and installed the first shipment of hardware and software to the Boise National Forest. Initially the electronic office programs will be implemented on the new system.

Future Needs:

At this time the DG/DBMS implementation is unscheduled, and the system will probably not be operational before fiscal year 1985. The ROI system requires a functional database management system and until the DG/DBMS is operational, only the noncomputerized aspects of the system can be implemented.

Recommendations:

1. Develop a database schema.

2. Develop a procedure for entering, updating, and retrieving the recreation opportunity information.

3. Concentrate initial computer applications on the development of the standard report package.

2. Information Dissemination

Existing Situation:

The Boise National Forest has the standard Forest Service brochures regarding safety, rules and regulations, etc.; however, recreation opportunity information specifically adapted to the Forest is extremely limited. The Forest Recreation and Off-Road Vehicle maps are out-of-date and inaccurate. The only specific recreation activities addressed include cross-country skiing and, to some extent, summer hiking and motorcycle trails. A recently completed interpretive trail brochure is the only publication of its kind on the Forest. A Forest recreation report is available as a recorded message, in the local newspaper, or as an information sheet at Forest offices. It contains current information on road conditions, logging activity, campgrounds, and certain other activities and is the only other means of providing information to the recreation public.

Future Needs:

At this time, recreation use on the Boise does not warrant extensive interpretive exhibits or displays or the use of highly sophisticated interpretative techniques; however, a more comprehensive uniform approach to the dissemination of information is needed to improve the flow of current and useful information to the various audience groups.

Recommendations:

1. Implement the ROG inventory as completed by each District. Transfer data to the DG/DBMS after the database schema is developed.

2. Prepare recreation opportunity selector guides based on activity, setting, and experience opportunities and combinations of these opportunities. These ROI guides would include opportunities for activities, such as hiking and camping; settings, such as high elevation lakes; and experience opportunities, such as learning about nature.

3. Inform the various audience groups of the ROI system, its operation and application.

4. Develop a plan to evaluate, monitor, and improve the ROI system's effectiveness.

IMPLEMENTATION PLAN

An implementation plan provides an essential tie between the concept and the functioning system. It is important to gain an overall perspective of the project and establish realistic objectives for establishing an operational Recreation Opportunity Information (ROI) System. Although the Boise National Forest Landscape Architects will be responsible for system implementation, District and Information Service support are critical to the success of an ROI System.

The Boise National Forest ROI system will be implemented in three phases:

Phase	Target Date
I. Noncomputerized ROI system with available recreation opportunity information.	6/85
II. Prototype of computerized ROI system with available recreation opportunity information.	6/86
III. Operational Forest ROI system.	6/87

A preliminary list of projects to be completed before implementation of the Boise National Forest ROI system follows:

System Component		Project	Target Date
AUDIENCE	1.	Re-evaluate the recreation public audience group.	9/84
INFORMATION	1.	Develop a ROG waterway activity inventory process based on the ROG process for route-related activities.	9/84
	2.	Update trail inventory.	1/85
	3.	Update ORV travel map	1/85

System Component		Project	Target Date
INFORMATION	4.	Develop a Forest trail guide.	6/85
	5.	Complete and implement a ROG inventory for each District as described in the ROG Manual.	
		a. Lowman RD (D-5)	6/85
		b. Cascade RD (D-4)	1/86
		c. Emmett RD (D-6)	1/86
		d. Boise RD (D-2)	1/87
		e. Mountain Home RD (D-1)	1/87
		f. Idaho City RD (D-3)	1/87
METHODS			
A. Data Management	1.	Develop an ROI system database schema.	1/85
	2.	Design a procedure for data entry, update, and retrieval.	6/85
	3.	Develop an information maintenance program.	1/86
B. Information Dissemination	1.	Develop a standard report package.	1/86
	2.	Develop a program and schedule for system evaluation, monitoring, and improvements.	6/86
	3.	Prepare recreation opportunity selector guides.	1/87
	4.	Update Forest Recreation map.	6/87
	5.	Develop an ROI system audience awareness package. monitoring.	6/87

SUMMARY AND CONCLUSIONS

This paper provides the framework for developing a Recreation Opportunity Information (ROI) system, based on the interrelationship of three components: the audience, the information, and the methods used to manage the data and disseminate the information to the audience.

The audience component is comprised of the resource, goods and services, and recreation public groups. These audience groups have information needs that can be satisfied by collecting and organizing data into useful recreation opportunity information.

Many sources must be used to complete the information component of an ROI system. The most useful inventory systems for this purpose are the Recreation Opportunity Spectrum (ROS) and the Recreation Opportunity Guide (ROG). These two systems were interfaced to provide a comprehensive organizational structure for recreation opportunity information. The ROS system provided the three major recreation opportunity categories: activity, setting, and experience. These categories were further subdivided based on more detailed ROS and ROG criteria and research data.

The final component considered in the ROI System involves the methods used for data management and information dissemination. Since the computer capabilities within the Forest Service have increased as a result of installing the Data General computer equipment, the computer was the logical choice for data entry, storage, and retrieval. In many cases, computer output can be used to disseminate the recreation opportunity information, although the opportunity for further interpretation of the information also exists.

Before the ROI System can become totally operational, one major area within the system will require further development. The data management component involves the development of a detailed database schema based on the organization of the information component. The basic framework has been established; however, only a rudimentary attempt has been made to describe the schema itself.

A functioning database management system is key to the most efficient and effortless use of the ROI System, although data on the various system components, such as audience groups, ROG, and ROS can be collected and used until implementation of the computer function is possible.

Commitment to the implementation and maintenance of an ROI System is crutial to its success. This support is particularly critical from District and Information Services staff since a majority of the recreation opportunity information will originate at the District level and be managed by the Information Services Staff at the Supervisor's Office level. As in many new systems, i.e. RIM in 1965, the initial costs may be high; however, the long term benefits will far outweigh the effort.

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APPENDIX A

ACTIVITY OPPORTUNITY CLASSIFICATION

VIEWING SCENES, ACTIVITIES, OBJECTS

1.1 Viewing Scenery (Sightseeing)**

1.3 Viewing Activities (Spectator)**

1.4 Viewing Works of Humankind

TRAVEL: ALL MOTORIZED, LAND

11.1 Automobile**

- a. Cars, PUs, Campers, Vans etc.
- b. 4-Wheel Drives

11.2 Motorized Vehicles: <4 wheels**

- a. Motorcyles
- b. Scooters
- c. Three Wheelers

11.3 Ice and Snow Craft**

- a. Snowmobile
- b. Ice Boat

11.4 Specialized Landcraft (ATV's): >4 wheels**

- a. Swamp Buggies
- b. Dune buggies
- c. Tracksters

11.5 Mass Touring Vehicles

- a. Buses
- b. Trains
- c. Cog Railways

** Boise National Forest Activities

TRAVEL: ALL MOTORIZED, WATER

12.1 Tour Vessel

a. Boat
b. Ship
c. Ferry

12.2 Boat, Powered**

a. Small Pleasure Craft
b. Houseboats
c. Airboats

TRAVEL: OTHER MISCELLANEOUS, LAND BASED TRAVEL

13.1 Aircraft, Motorized**

a. Fixed Wing, Noncommercial
b. Fixed Wing, Commercial
c. Rotor Aircraft
d. Ultra-lights

13.2 Aerial Transportation Devices

a. Trams (Other than for skiing)
b. Lifts (Other than for skiing)

13.3 Aircraft, Non-Motorized

a. Hang gliders
b. Parachutes
c. Winged Gliders
d. Balloons

** Boise National Forest Activities

TRAVEL: NON-MOTORIZED, LAND

14.1 Foot Travel**

- a. Walking
- b. Hiking
  - 1. Trail
    - a. Easy
    - b. Intermediate
    - c. Difficult
  - 2. Cross Country
- c. Jogging/Running
  - 1. Marathon
  - 2. Exercise

14.2 Bicycle: 3 Wheels**

- a. Pleasure
- b. Racing
- c. Mountain

14.3 Horseback**

- a. Pleasure
- b. Endurance

TRAVEL: NON-MOTORIZED, WATER

15.1 Canoeing**

- a. Class 1
- b. Class 2
- c. Class 3
- d. Class 4

15.2 Sailing**

- a. Pleasure
- b. Racing

** Boise National Forest Activities

15.3 Other Watercraft**

a. Rowboating
b. Drifting
c. Rafting
    1. Class 1
    2. Class 2
    3. Class 3
    4. Class 4
d. Kayaking
    1. Class 1
    2. Class 2
    3. Class 3
    4. Class 4
e. Tubing
f. Floatboating

SPORTS/GAMES

21.1 Team Sports**

a. Football
b. Baseball
c. Volleyball

21.2 Individual Sports**

a. Golf
b. Tennis
c. Archery
d. Target Practice
e. Horseshoes
f. Mapping/Orienteering

21.3 Games & Play**

a. Cards
b. Board Games
c. Children's Games
d. Frisbee
e. Playing Catch
f. Dancing
g. Playground Activities

** Boise National Forest Activities

WATER SPORTS AND PLAY

22.1 Swimming and Waterplay**

a. Swimming
b. Diving
c. Beach Play
d. Sunbathing
e. Hot Springs Bathing
f. Competitive Swimming Events
g. Use of Floating Devices

22.2 Diving**

a. Skin Diving
b. Scuba Diving/Snorkeling
c. Competitive Diving Events

22.3 Waterskiing & Other Water Sports**

a. Waterskiing
b. Ski Jumping
c. Kiting
d. Platter-riding
e. Surfing

FISHING, ALL (Includes recreation harvest of non-fish acquatic life)

31.1 Fishing, Cold Water**

a. Lakes/Ponds
   1. Fly
   2. Lure
   3. Bait
b. Streams/Rivers
   1. Fly
   2. Lure
   3. Bait

** Boise National Forest Activities

31.2 Fishing, Warm Water

a. Lakes/Ponds
   1. Fly
   2. Lure
   3. Bait
b. Streams/Rivers
   1. Fly
   2. Lure
   3. Bait

31.3 Fishing, Salt Water

a. Ocean
b. Esturary

31.4 Fishing, Ice**

a. Bait
b. Lure

CAMPING

41.1 Camping, General Day**

a. Developed: Nonspecific leisure and activities relating to camping in temporary shelters or no shelter
b. Dispersed: Nonspecific leisure and activities relating to camping in temporary shelters or no shelter

41.2 Camping, Night (Auto)**

a. Developed: Camping in a transportation vehicle
b. Dispersed: Camping in a transportation vehicle

41.3 Camping, Night (Trailer)**

a. Developed: Camping in a towed shelter
b. Dispersed: Camping in a towed shelter

41.4 Camping, Night (Tent)**

a. Developed: Camping in a non-vehicle related shelter or no shelter
b. Dispersed: Camping in a non-vehicle related shelter or no shelter

** Boise National Forest Activities

41.5 Organization Camping, General Day**
Nonspecific leisure activities occurring on organization sites

41.6 Organization Camping, Night**
Overnight use of organization camps.

PICNICKING

43.1 Picnicking**
Eating meals in a National Forest/grassland environment for pleasure and relaxation

OTHER ACCOMMODATIONS

46.1 Resort and Commercial Public Service, General Day**
All nonspecific daytime activities and general leisure at hotels, lodges, resorts, and other public service sites (i.e. stores, restaurants, filling stations, etc.)

46.2 Resort Lodging, Night**
Overnight use of hotels, lodges, resorts, motels, hotels, cabins, etc.

46.3 Recreation Cabin Use**
Day and night use of permitted recreation residences or Forest Service owned cabins

WINTER SPORTS

51.1 Ice Skating**

51.2 Sledding, Tobogganing

51.3 Skiing, Downhill**

a. Developed Area
   1. Beginner/novice
   2. Intermediate
   3. Advanced/Expert
b. Dispersed Area

51.4 Snow Play**

a. Coasting/Sliding
b. Snow/Ice Sculpture
c. Snow Balling/General Play

** Boise National Forest Activities

51.5 Cross-Country Skiing, Snowshoeiug**

a. Cross-country skiing
    1. Beginner/Novice
    2. Intermediate
    3. Advanced/expert
b. Snowshoeing

HUNTING, ALL NON-COMMERCIAL

61.1 Hunting, Big Game**

61.2 Hunting, Small Game**

61.3 Hunting, Upland Birds**

61.4 Hunting, Waterfowl**

NATURE STUDY, ALL

62.1 Nature Study**

a. Wildlife
b. Birds
c. Fish

62.2 Nature Study**

a. Caving/Spelunking
b. Photography
    1. Geological
    2. Historical/Cultural
    3. Plants
    4. Animals (excluding wildlife, birds, fish)
    5. Scenic Landscapes
c. Collections
    1. Geological
    2. Historical
    3. Plants
    4. Animals (excluding wildlife, birds, fish)
d. Natural History
e. Archaeology
f. Geography

** Boise National Forest Activities

MOUNTAIN CLIMBING

3.1 Mountain Climbing**

a. Scrambling
b. Rope Climbing
c. Bouldering
d. Solo Climbing
e. Snow/Ice Climbing

GATHERING FOREST PRODUCTS

64.1 Gathering Forest Products**

a. Christmas Tree Cutting
b. Mushrooming
    1. Morels
    2. Puffballs
c. Firewood Cutting
    1. Larch
    2. Douglas-fir
    3. Grand fir
    4. Ponderosa Pine
    5. Lodgepole Pine
d. Picking fruits, nuts, & berries
    1. Huckleberries
    2. Elderberries
    3. Currants
    4. Gooseberries
e. Nature Crafts
    1. Pine needles/boughs
    2. Driftwood
f. Ocean Shore
    1. Clams
    2. Oysters
    3. Sea Shells

** Boise National Forest Activities

VISITOR INTERPRETIVE SERVICES

81.1 Viewing Interpretive Exhibits**

- a. Indoor Exhibits
- b. Outdoor Exhibits

81.2 Attending Talks and Programs**

- a. Indoor Presentations
- b. Outdoor Presentations

81.3 Touring, Guided (Other than by foot)**

81.4 Touring, Unguided (Other than by foot)**

81.5 Walking, Guided (Pedestrian travel)

81.6 Walking, Unguided (Pedestrian travel)**

81.7 Viewing Interpretive Signs

81.8 Listening to Audio Programs

81.9 General Information**

- a. Brochures
- b. Maps
- c. Road closures
- d. Campground closures

** Boise National Forest Activities

APPENDIX B

INFORMATION COMPONENT

HIERARCHY			REFERENCE SOURCE
Category	Subcategory	Item/Sub-Item	
ACTIVITY	See Appendix A	See Appendix A	ROG, Code-A-Site, RIM, Research (See Appendix A)
SETTING	Physical	Remoteness and Accessibility	ROG, Road/Trail inventories Airstrip and Railroad (map locations)
		Area Size	ROS class delineation
		Evidence of Humans *Management Activities *Structures	Existing Visual Conditions (EVC); Site plans; Forest Map
		Land Type Association	Land type inventory
		Vegetation	Timber condition class inventory
		Attractiveness	Variety class inventory
	Social	User Density	Sampling of activities
			Personal Knowledge of Area
		Length of Season	Personal Knowledge of Area
		Occupancy Rate	Personal Knowledge of Area

INFORMATION COMPONENT

HIERARCHY			REFERENCE SOURCE
Category	Subcategory	Item/Sub-Item	
SETTING	Managerial	Policy	Forest Recreation Manuals and Handbooks
		Regulations	CFR; Special Orders ORV Plan; Other Agency or Private Party Regulations
		Evidence of Regimentation and Controls	ROS inventory, personal knowledge,
		Special Facilities *Physically Handicapped *Blind/Sight Impaired *Deaf/Hearing Impaired *Non-English Speaking	RIM, Personal knowledge
		Safety	Personal knowledge, signing
		Environmental Education	Personal Knowledge
EXPERIENCE	Achievement	Reinforcing Self-image Social recognition Competence Testings Seeking Stimulation	Research Data
	Leadership/ Autonomy	Independence/ Autonomy Control/Power Teaching/Sharing Skills Leading Others	

INFORMATION COMPONENT

HIERARCHY			REFERENCE SOURCE
Category	Subcategory	Item/Sub-item	
EXPERIENCE	Risk-taking		Research Data
	Equipment		
	Family Togetherness		
	Being with People (Social Contact)	Being with Friends	
		Being with Similar People	
	Meeting-Observing New People	Meeting New People	
		Observing Other People	
	Learning-Discovery	General Learning	
		Exploration	
	Relationships with Nature	Scenery	
		General Nature Experience	
		Learn About Nature	
	Reflect on Personal Values	Spiritual	
		Introspection	
	Creativity		
	Nostalgia		
	Exercise-Physical Fitness	Exercise-Physical Fitness	
	Physical Rest		
	Escape Personal - Social Pressures	Tension Release	
		Slow Down Mentally	
		Escape Daily Routine	
		Escape Perceived Pressures	

INFORMATION COMPONENT

HIERARCHY			REFERENCE SOURCE
Category	Subcategory	Item/Sub-item	
EXPERIENCE	Escape Physical Pressures	Tranquility	Research Data
		Seek Open Space	
		Privacy	
		Escape Crowds	
		Escape Physical Stressors	
	Escape Family		
	Security		
	Temperature		